SUBMITTAL FOR:

Northwest Harnett Elementary School

Harnett County Public Schools

736 Rollins Road,

Fuquay-Varina, NC 27526

BDA System

Product Data

Submitted By:

North Carolina Sound of Goldsboro, LLC

To:

Moonlite Electric and Construction Inc

05/23/23

5413 Hwy 117N Pikeville, NC 27863
919-709-4040 Phone 919-709-4044 Fax

Northwest Harnett ES

BDA System

Quantity	Manufacturer	Part Number	Description
1	NewMar	AP-8000B	BDA ANNUNCIATOR PANEL
1	NewMar	PE-12V-120-100AH-UL2524	12V-120-100AH-UL2524 BDA POWER SUPPLY
1	TowerIQ	Guardian4	80dB Public Safety Band BDA Signal Booster
2000	TowerIQ	3996054	1/2 INCH CONDUCTOR AIR DIELECTRIC CABLE
1	Trilogy	PCT012-2	Power Plenum Strip tool for ½"cable
3	TowerIQ	TQ-WS-2	Wide Band 2 Way Splitter
3	TowerIQ	TQ-C-6	-6dB Coupler
6	TowerIQ	TQ-C-10	-10dB Coupler
2	TowerIQ	TQ-ATNR-10	10 dB RF Attenuator
3	TowerIQ	TQ-ATNR-20	20 dB RF Attenuator
54	Trilogy	NMP01250	TRILOGY N MALE CONNECTOR
1	TowerIQ	TQ-LP	Lightning Protector
13	TowerIQ	TQ-530W	MULTI BAND DOME ANTENNA
1	TowerIQ	TQ-230W	Wide Band Yagi Dir 50 ohm, 10 to 11dBi, (inc mounting kit)
1	TowerIQ	TQ-Mount-JBar	Steel 1 inch J-Bar mount for donor antenna (No Spec Sheet)

Annunciator Panel

Annunciator Panel, model AP-8000B, is a micro-processor controlled fire alarm annunciator panel for use with In-building 2-Way Emergency Radio Communication Enhancement System (ERCES) required by the National Fire Protection Agency (NFPA 1221). It monitors the alarms of the Bi-Directional Amplifier (BDA) and Battery Back-up Unit (BBU) and provides visual and audible alarms, as well as communicates these alarms to the fire control panel (FACP) via up to eight sets of Form-C alarm contacts. The first five alarms are wired for NFPA mandated alarms; AC Power Failure, Low Battery, Charger Failure, BDA Failure and Antenna Failure. Three additional alarm relays are available for site customization per UL Standard 2524.

Features

- Designed for easy set-up and installation in a NEMA 4 enclosure, powder coated steel
- Wide operating voltage range: 12, 24 and 48 volt systems
- Eight (8) Form-C alarm relay outputs with terminals for end of line resistors
- Alarm Input Wiring Supervision continuously monitors alarm input wiring for faults, either NO or NC contacts
- Master/Remote operation allows up to 15 additional AP-8000B's to be connected by daisy chain
- Up to 15 remotes can be powered via Cat 5 cable (POE)
- Built-in battery back-up (option)
- Front panel "test" alarm button
- Ultra bright light emitting diodes
- Alarm silence button (24 Hrs.) located inside enclosure
- Easily adapted to fit nearly any situation, 12, 24 and 48V DC battery back-ups
- Selectable Alarm Input: Can be activated by contact open (default) or contact closure upon alarm.
- End of Line resistors included

Specifications

Input: 9 - 60V DC

Input Current Draw: <100 mA

Max. Power Consumption: 4.5 watts

Operating Temperature: -4 to 122° F (-20 to 50° C)

Heat Dissipation: <12 watts (worst case)

Relay Switching Current: 2-Amp DC (resistive)

Enclosure: NEMA-4, UL listed, welded steel, quarter turn latch, bonding studs on door and enclosure, continuous stainless steel hinge with welded brackets for enclosure mounting, one each NPT-1/2 and NPT-3/4 liquid tight cord grips included.

Master/Remote Multiple Annunciators: Allows 1 master and up to 15 remotes to be wired in sequence via RS-485 connectivity

POE: Master can power up to 15 remotes via Cat. 5 cable

Options

Summary Alarm (Auto Dialer): Alarm relay #8 can be re-programmed via DIP switch to act as a summary alarm for alarm inputs #1 - 7 in order to activate an auto dialer or other device.

Loss of Annunciator Panel Power Alarm: Provides a normally closed alarm contact that opens upon loss of power to annunciator panel.

Model	Dimensions (H x W x D)	Weight (Lbs.)
AP-8000B	11.375" x 8" x 4.75"	7.35

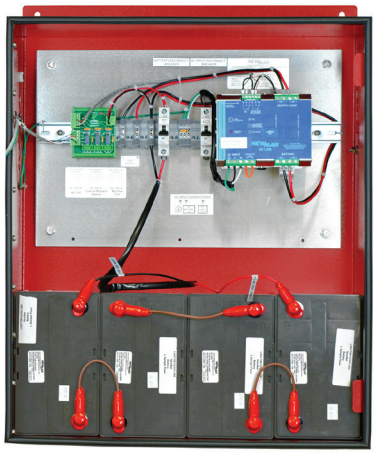
NFPA Compliant Battery Back-Up Power

ETL Listed to UL Standard 2524 & 924 Public Safety/BDA In-Building Coverage

An integral part of an in-building solution for emergency response radio coverage is the backup power system. NFPA codes relating to the autonomous operation and monitoring of the BDA power is quite stringent. These back up power enclosures were engineered to meet every aspect of NFPA 1221 and provide integrators configuration flexibility and rapid delivery directly to site, batteries included.

Features

- ETL listed to UL 2524 & 924
- NFPA compliant
  - All required monitoring alarms
- Batteries included
  - Choose capacity to match system requirements
- NEMA-4 enclosure
- Lightweight and prewired with waterproof feed-thru's for easy one-man install and on-site connections



Enclosure A
12, 24, & 48V DC, 18 - 100AH

Specifications

Input: 115/230 VAC (factory wired for 120V AC)

Outputs:
DC: 12, 24 and 48V, with 120, 240 and 480 Watt DC UPS
AC: 110V at 96 watts - see reverse for detailed specifications

Protections: Battery breaker, AC input breaker, NEMA enclosure, liquid tight cord grips

NFPA 1221 Compliant Alarms (Form C, Dry Contact)

- AC fail
- Battery discharged to 30% of capacity
- Charger fail

Batteries Included: maintenance free, valve regulated, sealed lead acid, 18, 55, and 100 AH capacity

Enclosure Size including Mounting Flanges (H x W x D):
A: 30" x 23" x 10.5"
B: 23.15" x 24" x 24"

UL Standard 2524
UL Standard 924

NFPA MEMBER
2020-2021

Enclosure B
48V, 100AH

Enclosure A: NEMA-4, UL listed (E465553), welded aluminum with IP 65 battery vent and locking door, IP-68 cable entries. Red powder coat wall mount.

Enclosure B: NEMA-4, welded aluminum with IP 65 vent, pad lockable door handle, IP-68 cable entries. Red powder coat wall mount.

Model	Output Voltage	Max. BDA Load Amps	Batt. A/H Capacity*	System w/ Batt. Wt. (Lbs.)	Shipping Wt. (Lbs.)	Enclosure Size
PE-12V-120-18AH-UL2524	12V DC	1.2A	18	49	89	A
PE-12V-120-55AH-UL2524	12V DC	3.8A	55	75	115	A
PE-12V-120-100AH-UL2524	12V DC	5A	100	111	151	A
PE-24V-240-18AH-UL2524	24V DC	1.2A	18	63	103	A
PE-24V-240-55AH-UL2524	24V DC	3.8A	55	114	154	A
PE-24V-240-100AH-UL2524	24V DC	5A	100	186	226	A
PE-48V-480-18AH-UL2524	48V DC	1.2A	18	90	130	A
PE-48V-480-55AH-UL2524	48V DC	4A	55	190	230	A
PE-48V-480-100AH-UL2524	48V DC	8.5A	100	371	411	B
PE-110V-165-100AH/24V-UL2524	110V AC	1.4A	100	191	231	A

**See reverse for battery specifications*

UL: Models ETL Listed to UL Standards 2524 & 924

NEMA

Powering the Network 0220

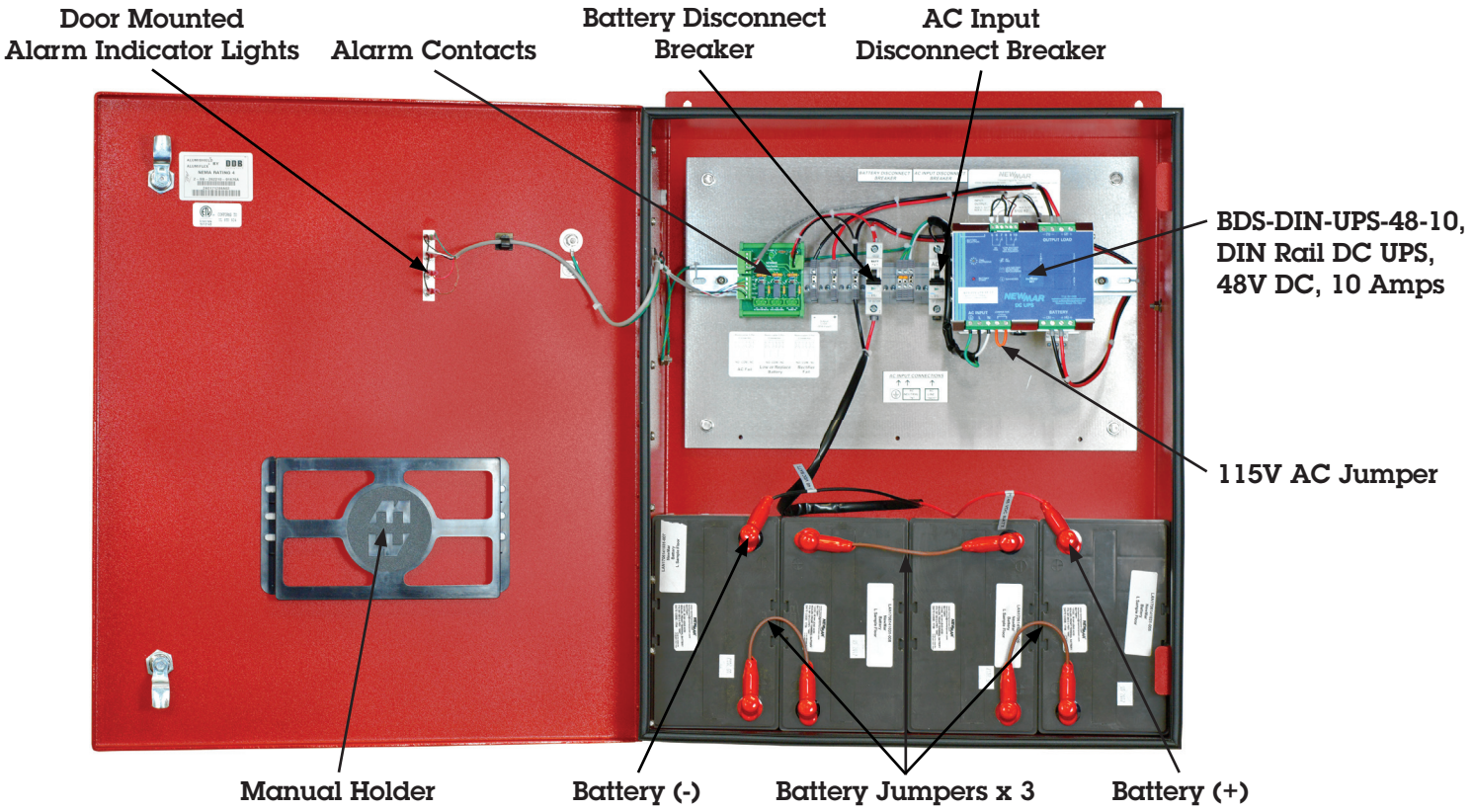
NFPA Compliant Battery Back-Up Power

Battery Specifications

Model	Amp/Hour	Battery	Quantity	Max Continuous Load 12 Hour Rating	Max Continuous Load 24 Hour Rating	Electrolyte Content Pounds	Electrolyte Content Gallons
12V DC							
PE-12V-120-	18AH-UL2524	ES17-12S	1	1.2A/15.2W	.75A/9W	1.9	0.3
PE-12V-120-	55AH-UL2524	XP12-210FR	1	3.8A/48.2W	2.33A/28W	7.6	0.8
PE-12V-120-	100AH-UL2524	PYL12V100FS	1	5A/63.5W	4.6A/55W	22.8	1.6
24V DC							
PE-24V-240-	18AH-UL2524	ES17-12S	2	1.2A/29.4W	.75A/18W	3.9	0.6
PE-24V-240-	55AH-UL2524	XP12-210FR	2	3.8A/93.1W	2.33A/56W	15.2	1.6
PE-24V-240-	100AH-UL2524	PYL12V100FS	2	5A/122.5W	4.6A/110W	45.7	3.2
48V DC							
PE-48V-480-	18AH-UL2524	ES17-12S	4	1.2A/60W	.75A/36W	7.7	1.3
PE-48V-480-	55AH-UL2524	XP12-210FR	4	4A/200W	2.33A/112W	30.5	3.2
PE-48V-480-	100AH-UL2524	PYL12V100FS	4	8.5A/392W	4.6A/221W	91.3	6.3
110V AC							
PE-110V-165-	100AH/24V-UL2524	PYL12V100FS	4	N/A	96W	91.3	6.3

Based on 100% duty cycle. Back-up time increase if intermittent duty cycle loads applied.
ETL Listed to UL Standards 2524 & 924

Typical Wiring Diagram



NEWMAR

Powering the Network

TOWERIQ™
SIGNAL WHERE IT MATTERS

Guardian4
Public Safety BDA

FEATURES

- Provides improved coverage for Public Safety 700 MHz (FirstNet) and 800 MHz
- 80 dB gain for Public Safety Bands
- Features built-in TowerIQ Sentry™ remote monitoring with ethernet port
- Integrated 7-pin alarm and UPS port for external battery backup
- NEMA-4 rated amplifier housing. No additional NEMA enclosure(s) needed
- Meets the code for NFPA 1221 and IFC 510
- Dry contact 7-pin alarm, UPS and Ethernet port for remote monitoring
- Energy-saving operation allows bands to remain dormant when not in use
- Automatic gain control (AGC)
- A/C 110V or D/C 12- 20V power option
- Independently adjustable frequency attenuation for uplink and downlink (Reduce gain in -1 dBm increments)
- Industry leading 3-year warranty available

TowerIQ's Guardian4 Public Safety Band signal booster amplifies FirstNet signals for crucial communications, delivering consistent signal for First Responders and other public safety officials relying on two-way radio communication inside large buildings.

The Guardian4 is a bi-directional amplifier with a maximum gain of 80 dB on the Public Safety frequency bands, supporting 700 MHz (FirstNet Ready) and 800 MHz.

In the majority of cases, newly constructed buildings with considerable size, or existing buildings that increase capacity by expanding the building footprint are required to have signal strength of -95 dBm or better in designated critical areas – elevators, stairwells, etc. – in order to receive a certificate of occupancy. Guardian4 meets the code for NFPA 1221 and IFC 510 and features a NEMA-4 rated amplifier housing, which eliminates the need for an additional NEMA enclosure.

Additionally, the Guardian4 comes equipped with dry contact 7-pin alarming capability, UPS and Ethernet port enabled remote monitoring. The BDA features sturdy metal construction and is covered by an industry leading 3-year warranty.

Long Island City, NY, 11101 | http://toweriq.nyc | (844) 626-7638

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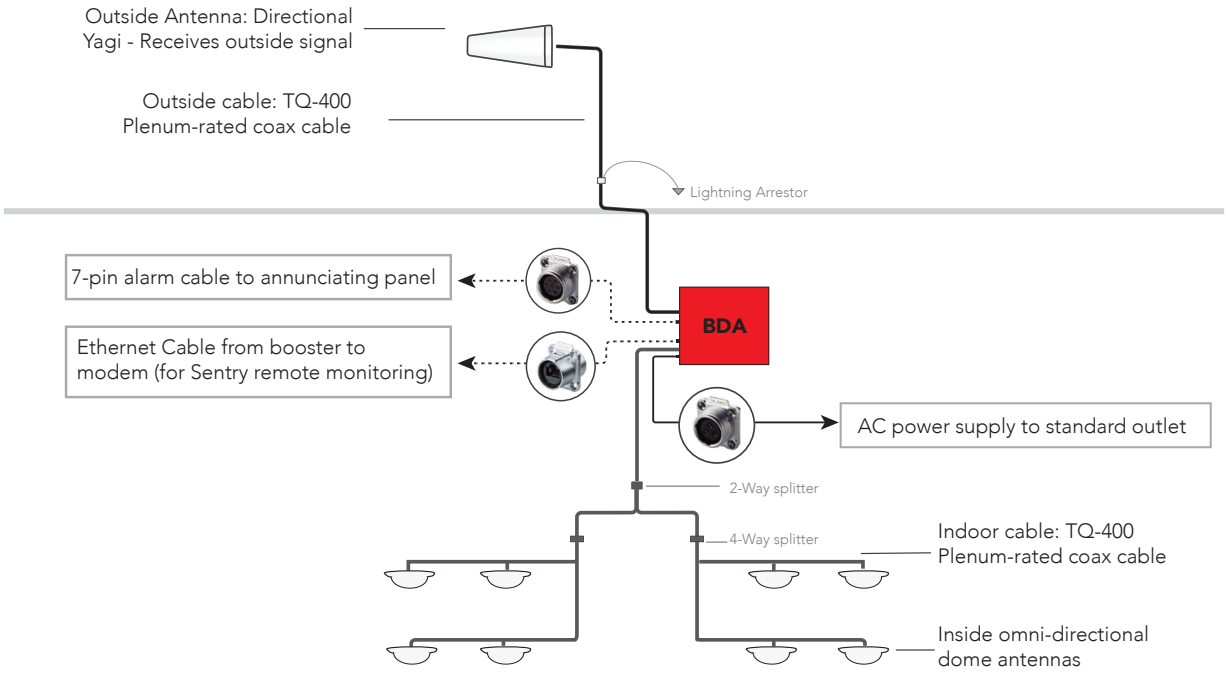
Electrical Specifications

Model	Guardian4
Uplink Frequency Range (MHz)	788-805 / 806-816
Downlink Frequency Range (MHz)	758-775 / 851-861
Maximum Gain:	80 dB
Supported Standards:	Public Safety 700 and 800 MHz
Gain Adjustment:	31 dB
Noise Figure:	≤ 5 dBm
Impedance:	50Ω
VSWR:	≤ 2.0
Power Input:	DC 12- 20V; AC 110V; 60 Hz
Maximum RF Output Power:	+27 dBm (DL), +26 dBm (UL)
P1dB:	31.5 dBm
Propagation delay	0.03 Microseconds
Operation Temperature:	-4°F to +131°F
Power Consumption	35W
FCC ID:	2AXVJGuard-2QR
Certifications	FCC Part 90 / UL: 60950-1

Technical Specifications

Dimensions	25 x 19 x 9 in
DL Frequency Range	758-775/ 851-861 MHz
Gain Adjustment	31 dB
Max Gain	80 dB
Max RF Output Power	+27 dBm (DL) +26 dBm (UL)
Noise Figure	≤ 5 dB
P1dB	31.5 dBm
Power Consumption	35W
RF Connections	N Female
UL Frequency Range	788-805/ 806-816 MHz
VSWR	≤ 2.0
Weight	54 lbs

Example Building Component Layout



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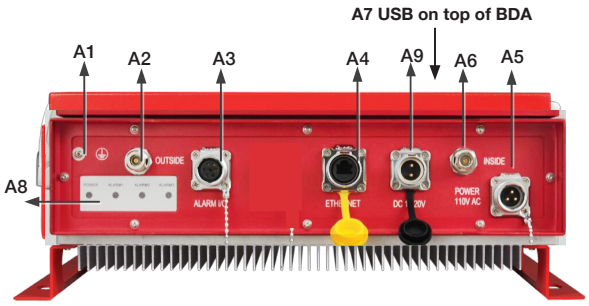
Guardian4 BDA Interface

Interface	Type	Description
A1	Grounding lug	Grounding lug
A2	OUTSIDE	N Female for OUTSIDE cable and antenna
A3	ALARM I/O	To Fire Department Control Box
A4	ETHERNET	Cat5e Standard Ethernet Cable Device
A5	POWER 110VAC	Connect to 110VAC or 110V of UPS output
A6	INSIDE	N Female for INSIDE cable and antenna
A7	USB	Used to initialize the network connection devices
A8	Alarm LEDs	Indicate an alarm condition
A9	DC 12-20V	Connect DC, voltage should be between 12-24V



[a] Outdoor Antenna Options			
TQ-230W	Directional Wide Band 50 Ω Yagi Antenna (698 - 2700 MHz)	N-Female connectors	10 to 11 dBi
[b] Inside Antenna Options			
TQ-528W	Omni Wide Band Dome 50 Ω Antenna (698 -2700 MHz)	N-Female connectors	3 to 4 dBi
TQ-248W	Directional Wide Band Panel 50 Ω Antenna (698-2700 MHz)	N-Female connectors	7 to 10 dBi
[c] Splitters and Couplers			
TQ-WS-2	Wide Band 2 Way Splitter		
TQ-WS-4	Wide Band 4 Way Splitter		
[d] Plenum Cable			
TQ-PL-1000	1000 ft, Ultra Low-Loss Coax Plenum Fire-Rated, Orange	Spool, no connectors	

UL-rated for plenum ceilings (UL E473791)

Additional Required Components:

Note: Some component options are listed in table below. Not all accessories are listed.

- One External antenna [a] (directional Yagi)
- Multiple Inside antennas [b] (omnidirectional domes and/or directional panels)
- Cable splitter for inside antennas [c]
- Sufficient TQ-400 ultra-low loss interior/exterior cable, 50 ohm [d]
- Lightning protector
- Grounded surge suppressor for DC power supply

Included Components:

- Guardian4 bi-directional amplifier with NEMA-4 rated housing and mounting kit
- Alarm cable and connector
- Ethernet connector
- AC power cable
- DC power cable and connector

⚠ WARNING

THIS IS NOT A CONSUMER DEVICE. IT IS DESIGNED FOR INSTALLATION BY FCC LICENSEES AND QUALIFIED INSTALLERS. USERS MUST HAVE AN FCC LICENSE OR THE EXPRESS CONSENT OF AN FCC LICENSEE TO OPERATE THIS DEVICE. USERS MUST REGISTER CLASS B SIGNAL BOOSTERS (AS DEFINED BY 47 CFR 90.219) ONLINE AT: WWW.FCC.GOV/SIGNAL-BOOSTERS/REGISTRATION.

UNAUTHORIZED USE MAY RESULT IN SIGNIFICANT FORFEITURE PENALTIES, INCLUDING PENALTIES IN EXCESS OF $100,000 FOR EACH CONTINUING VIOLATION.

Part 90 Signal Boosters. THIS IS A 90.219 CLASS B DEVICE.

Ordering Information

Model	Description	Stock No.
Guardian4	80dB PublicSafety Band BDA Signal Booster	3996001

TOWERIQ™
SIGNAL WHERE IT MATTERS

50 Ohm Plenum Cable 1/2”

FEATURES

- AirCell® Non Pressurized Air Dielectric Design for Superior RF Performance and Ease of Installation
- Plenum Rated Jacketed CMP
- Conforms to NFPA-262, UL-444, Canadian CSA 222

RoHS COMPLIANT 2011/65/EU

PROUDLY MADE IN THE USA

Technical Specifications

Physical Dimensions	• Center Diameter, in (mm) 0.188 (4.78) • Diameter Over Outer Conductor, in (mm) 0.550 (13.97) • Maximum Diameter Over Jacket, in (mm) 0.63 (16.00)
Cable Materials	• Center Conductor Copper-Clad Aluminum • Outer Conductor Corrugated Aluminum
Jacket Color	Off White
Maximum Frequency	10 GHz
Peak Power Rating	35 KW
DC Resistance	• Center 0.46 (1.51) Ohms/1,000 ft (1,000m) • Outer 0.51 (1.67) Ohms/1,000 ft (1,000 m)
DC Breakdown	2 kV
Capacitance	22 (72.12) mH/ft
Inductance	0.057 (0.187) mH/ft (m)
Jacket Spark	8 kV RMS
VSWR min	1.25 (19.0) (dB)
VSWR typical	1.13 (24.3) 700-960/1700-2200 MHz (dB)
Impedance	50 ± 2 Ohms
Velocity of Propagation	94%
Minimum Bend Radius	• Single 2 (50.8) in (mm) • Multiple 5 (127) in (mm)
Cable Weight	0.13 (0.20) lb/ft (kg/m)
Bending Moment	1 (1.4 ft lb (N m)
Tensile Strength	250 (114) lb (kg)
Flat Plate Crush	78(1.39) lb/in (kg/mm)
Number of Bends	15 minimum
Recomended Temperatures	• Install Temp. ‘+5° to 194°F (-15° to 90°) • Storage Temp. ‘+5° to 194°F (-15° to 90°) • Operating Temp. ‘+5° to 194°F (-15° to 90°)

The TowerIQ 50 Ohm 1/2” Plenum rated air dielectric cable is the superior choice for Public Safety in-building DAS systems. It conforms to NFPA, UL and CSA standards for Public Safety cabling to ensure our cable meets the highest level of quality and reliability in the industry. With low VSWR and DC Resistance the TowerIQ Plenum rated 1/2” cable is an ideal solution for your Public Safety DAS installation.

Standard Conditions
For Attenuation: VSWR 1.0, Ambiant Temperature 20°C (68°F)
For Average Power: VSWR 1.0, Ambiant Temperature 40°C (104°F), Inner Conductor Temperature 100°C (212°F), No Solar Loading

TL 9000 H-V - All Cables designed and manufactured under this quality management system

Ordering Information

Model	Description	Stock No.
50 Ohm Plenum Cable	1/2”, Corrugated (6 GHz), Jacketed CMP, Conforms to NFPA-262, UL-444, Canadian CSA 22.2/FT6	3996054

AirCell®

Tools

Cable Prep Tool Specification

PCT012-2 AirCell® All-In-One Cable Prep Tool

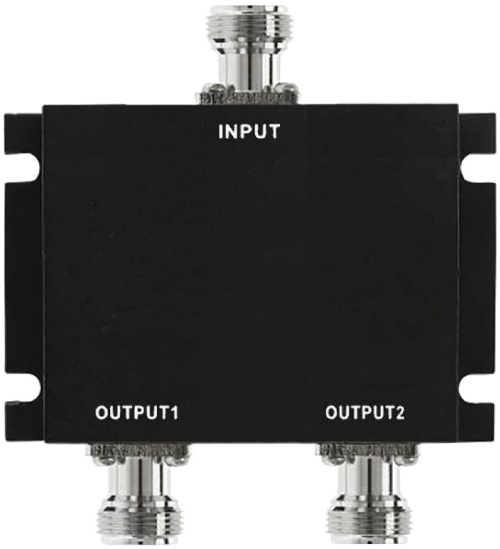
For use with AirCell® 1/2" Plenum, In-Conduit, and Conduit Cables, 50 Ohm

Description	PCT012-2
General Specifications	
Product Line	Coaxial Cable Tools
Product Type	Drill Mounted Cable Prep Tool
Cable Type	Plenum, In-Conduit, & Conduit Cable
Cable Family	AP6, APC, AC, ACC, & AP
Cable Size	1/2"
Accessories	
Spare Parts/Replacement Blades	PCT012-2RB/3PK
Mechanical Specifications	
Material	Aluminum
Packaging Information	
Package Quantity	1 Tool Per Box

Notice: Trilogy disclaims any liability or responsibility for the results of improper or unsafe installation, inspection, maintenance or removal practices

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-WS Wide Band Splitter



FEATURES

- Wide Band 698-2700Mhz
- • 2, 3 or 4 way Splitters
- • Meets international standards
- • Stainless steel

These bi-directional splitters allow from 2 to 4 inside antennas to be used with a single amplifier. Each inside antenna connection has ≤ 0.4 dB signal loss. The full band splitters cover PCS, Cellular, AWS and LTE band systems from 698 MHz to 2700 MHz.

These splitters transmit and receive signal and distribute equal amounts of signal sent to two to four interior antennas for similarly sized areas.

Technical Specifications

Item	2-Way Splitter	3-Way Splitter	4-Way Splitter
Model #	TQ-WS-2	TQ-WS-3	TQ-WS-4
Frequency Range	698-2700Mhz		
Insertion Loss	≤0.4dB	≤0.5dB	≤0.6dB
VSWR	≤1.5:1		
Isolation	≥22dB		
Maximum Power	20W		
Dimension (with connector)	3.5 x 3.9 inch	4.3 x 4.8 inch	4.3 x 4.8 inch
Weight	8.4 oz	12.5 oz	13.0 oz

Ordering Information

Model	Description	Stock No.
TQ-WS-2	TQ-WS-2 Wide Band 2 Way Splitter	3996025
TQ-WS-3	TQ-WS-3 Wide Band 3 Way Splitter	3996026
TQ-WS-4	TQ-WS-4 Wide Band 4 Way Splitter	3996027
TQ-WS-2-5G	SPL TQ-WS-2-5G Ultra-WideBand 2-Way Splitter	3996119
TQ-WS-3-5G	SPL TQ-WS-3-5G Ultra-WideBand 3-Way Splitter	3996120
TQ-WS-4-5G	SPL TQ-WS-4-5G Ultra-WideBand 4-Way Splitter	3996121

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-C Coupler

FEATURES

- Allows for multiple broadcast antennas
- Ensures adequate signal
- -6 and -10 dB options
- 5G Ultra-Wideband options available

A coupler, also known as a tap, is used when placing multiple broadcast antennas in a long line when installing a cell phone signal booster system. This component unevenly distributes the signal coming into and out of the coupler. This allows less signal loss out of one port ensuring that the next broadcast antenna down the line receives adequate signal. The coupler comes in -6 dB and -10 dB options.

Technical Specifications

Model #	TQ-C-6	TQ-C-10
Type	-6 dB	-10 dB
Insertion loss	1.7 dB	0.8 dB
Coupling port loss	6 ± 0.6 dB	10 ± 0.8 dB
Directivity	≥20 dB	
Frequency range	698 - 2500 MHz	
VSWR	≤1.25	
Power Capacity	200W	
Impedance	50 Ω	
Connector Type	N-Female	
Dimension	120 × 40 × 17 mm (Without Connectors)	
Weight	2.26 oz (64 g)	
Operating Temperature	-30° to +65° C	
Color	Black	

Ordering Information

Model	Description	Stock No.
TQ-C-6	TQ -C-6 -6dB Coupler	3996028
TQ-C-10	TQ-C-10 -10dB Coupler	3996029
TQ-C-6-5G	TQ-C-6-5G Ultra-Wideband - 6 dB Coupler	3996122
TQ-C-10-5G	TQ-C-10-5G Ultra-Wideband -10 dB Coupler	3996123

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-ATNR Attenuators

FEATURES

- High quality, low-loss connector
- Weather resistant
- Commercial grade

Connect attenuators in between the booster and the outside antenna cable to automatically lower the signal strength by 5, 10 or 20 dB.

Reduce the signal level coming from or going to cell towers with the addition of one or more attenuators.

Technical Specifications

Model #	TQ-ATNR-5	TQ-ATNR-5	TQ-ATNR-20
Attenuation	5 dB	10 dB	20 dB
Attenuation Accuracy	± 0.6 dB	± 0.8 dB	± 0.8 dB
VSWR	≤1.2		
Power Consumption	10 W		
Impedance	50 Ω		
Connector Type	N-Female, N-Male		
Dimension	Φ 20 x 58 mm		
Weight	2.26 oz (64 g)		
Operating Temperature	-67°F to 257°F (-55 to +125°C)		

Ordering Information

Model	Description	Stock No.
TQ-ATNR-5	TQ-ATNR-5 5 dB RF Attenuator	3996031
TQ-ATNR-10	TQ-ATNR-10 10 dB RF Attenuator	3996032
TQ-ATNR-20	TQ-ATNR-20 20 dB RF Attenuator	3996033

AirCell®

Connectors & Tools

TRILOGY® Communications

Connector Specification

NMP01250 AirCell® 50 Ohm Connectors

For use with AirCell® 1/2" 50 Ohm Plenum, Conduit and In-Conduit Cables

Description	NMP01250
General Specifications	
Interface	N Male
Body Style	Straight
Electrical Specifications	
Impedance, Ohms	50
Operating Frequency Band	0.3 MHz to 6 GHz
Dielectric Withstand Voltage	2 kV DC
3rd Order IMD	-140 dBc minimum, -150 typical
3rd Order IMD, Test Method	2 x 20 Watt carriers
Average Power	0.6 kW
Peak Power, maximum	10 kW
Insertion Loss, typical	0.05
Shielding Effectiveness	-130 dB
Return Loss (VSWR)	
DC to 1 GHz	30 dB (1.06)
1 GHz to 2 GHz	31 dB (1.06)
2 GHz to 3 GHz	32 dB (1.06)
3 GHz to 4 GHz	25 dB (1.12)
4 GHz to 5 GHz	20 dB (1.22)
5 GHz to 6 GHz	15 dB (1.43)
Mechanical Specifications	
Outer Contact Plating	Silver
Inner Contact Plating	Silver
Interface Durability	500 cycles
Interface Durability Test Method	IEC 16916
Minimum Connector Pull-off Force	200 lbs
Environmental Specifications	
Operating Temperature, °F (°C)	-40° to 158° (-40° to 70°)
Storage Temperature, °F (°C)	-40° to 158° (-40° to 70°)
Installation Temperature, °F (°C)	23° to 122° (-5° to 50°)
Immersion Test Method	IEC60529:2001 IP68
Corrosion Test Method	MIL-STD-1344A
Thermal Shock Test Method	MIL-STD-202F
Vibration Test Method	MIL-STD-202F
Regulatory Compliance/Certifications	
RoHS 2011/65/EU Compliant	
TL 9000 H-V - All Cables designed and manufactured under this quality management system	

Notice: Trilogy disclaims any liability or responsibility for the results of improper or unsafe installation, inspection, maintenance or removal practices

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-LP Lightning Surge Protector

Technical Specifications

Impedance		50
Insulation Resistance		≥5000
Contact resistance (MΩ)	Inner conductor (MΩ)	≤1
	Outer conductor (MΩ)	≤1
Pressure AC (Vmin)		2500V 1min 2500V 1min - No breakdown and no arcing phenomenon
Frequency Range (MHz)		DC-3000
Peak Power (w)		200
Initial discharge voltage (V)		230
Peak discharge current (KA)		10/20
Insertion Loss (dB)		≤0.50
V.S.W.R.		≤1.20
Weight (g)		110

Material Information

Part	Material	Electroplating
Hull	Brass rods	Ni
Plughole	Brass rods	Au
Contact pin	Brass rods	Au
Inner conductor	Brass rods	Au
Sealing element	Silicon rubber	N/A
Dielectric	PTFE	N/A
SC	Stainless	N/A

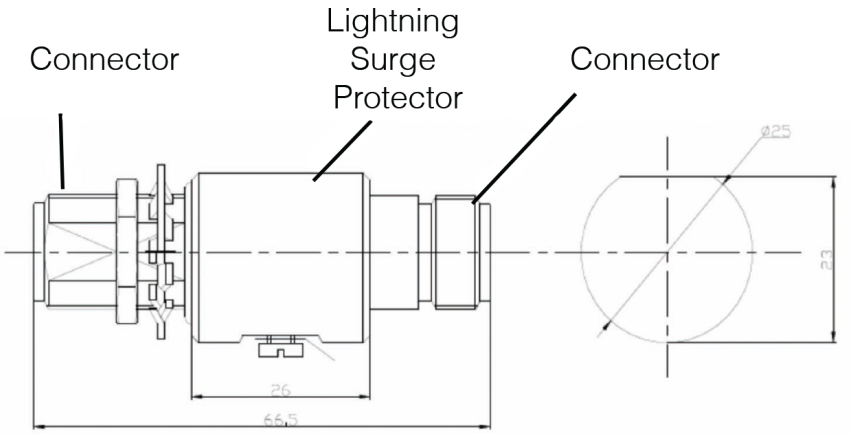
The TQ-LP coaxial lightning arrestors act as a signal filter and are designed to pass desired frequencies while suppressing lightning surges. Lightning strike electrical surges are diverted through the protector's short-circuit to the ground. TQ-LP features N-Female connectors on both ends.

Installation

To ground the surge protector, use 10 or 12-gauge copper wire and attach it to the ground connector screw.

Tighten the screw so the wire is firmly embedded under the screw. Clip the other end of the wire and strip back the jacket to expose the raw wire.

Attach the wire to a grounding point or rod sunk into the ground 8 feet deep. Be sure to check local grounding code requirements as they vary by location.



Ordering Information

Model	Description	Stock No.
TQ-LP	Lightning Protector	3996042

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-530W Multi Band Dome Antenna

FEATURES

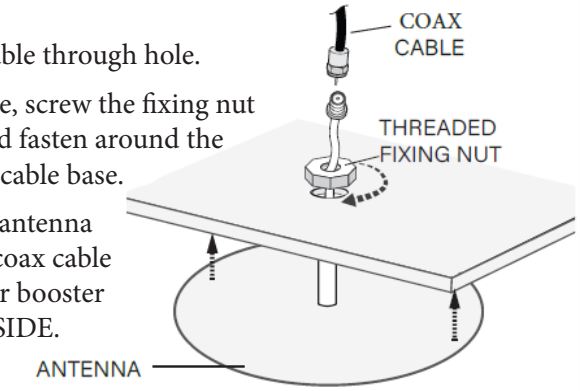
- Wide Frequency Band (698 – 2700 MHz)
- 2G/3G/4G/LTE Coverage
- Low VSWR & High Gain
- Easy Installation in projects
- Corrosion Resistance, Anti-aging
- Widely used for In-buiding DAS

The TQ-530W multi band dome antenna is an omni-directional interior antenna. The range of antenna is dependent on three factors: 1) physical obstructions, 2) power generated by booster/ amplifier, and 3) reception from outside signal received and distributed by outside antenna.

In addition to the antenna itself, parts include equipment for mounting on the ceiling.

Installation

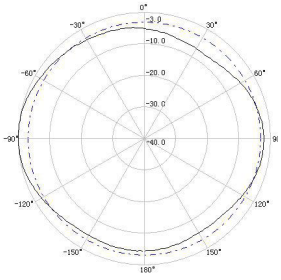
1. Drill a 18 mm diameter hole in the ceiling.The size should be large enough to allow the antenna's plastic cable base to pass through.
2. Place antenna cable through hole.
3. From crawl space, screw the fixing nut onto antenna and fasten around the threaded plastic cable base.
4. Connect female antenna connector with coax cable that leads to your booster port marked INSIDE.



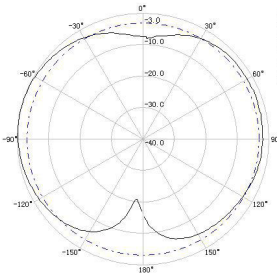
Technical Specifications

Model No.	TQ-530W Multi Band Dome Antenna	
Frequency(MHz)	698-960	1710-2700
Polarization	Vertical	Vertical
Gain (dBi)	2.5	5
Horizontal beam width(°)	360°	360°
Vertical beam width(°)	80°	45°
VSWR	≤1.8	≤1.7
3rd PIM(dBc)	≤-153dBc@2*43dBm	
Average Power(W)	50	
Impedance (ohm)	50	
Connector & Cable Color	N-Female & White	
Light Protection	DC-Ground	
Working Temp(deg)	-40~+55	
Radome Material and Color	UV-Protected ABS, White	
Rated Wind Velocity (m/s)	36.9	
Wind Loading area (M^2)	≤0.2	
Dimensions(mm)	Ø203*43	

Antenna Pattern



H-Plane



E-Plane

Ordering Information

Model	Description	Stock No.
TQ-530W	TQ-530W is an wide band omni-directional interior 50 Ohm antenna	3996128

TOWER IQ™
SIGNAL WHERE IT MATTERS

Guardian TQ-230W Wide Band Outdoor Yagi Antenna

FEATURES

- Wide Band (698 – 2700 MHz)
- 2G/3G/4G and WLAN systems
- Directional antenna – designed to be pointed directly at the cellular tower
- 8 dBi Gain
- Designed for outdoor use only

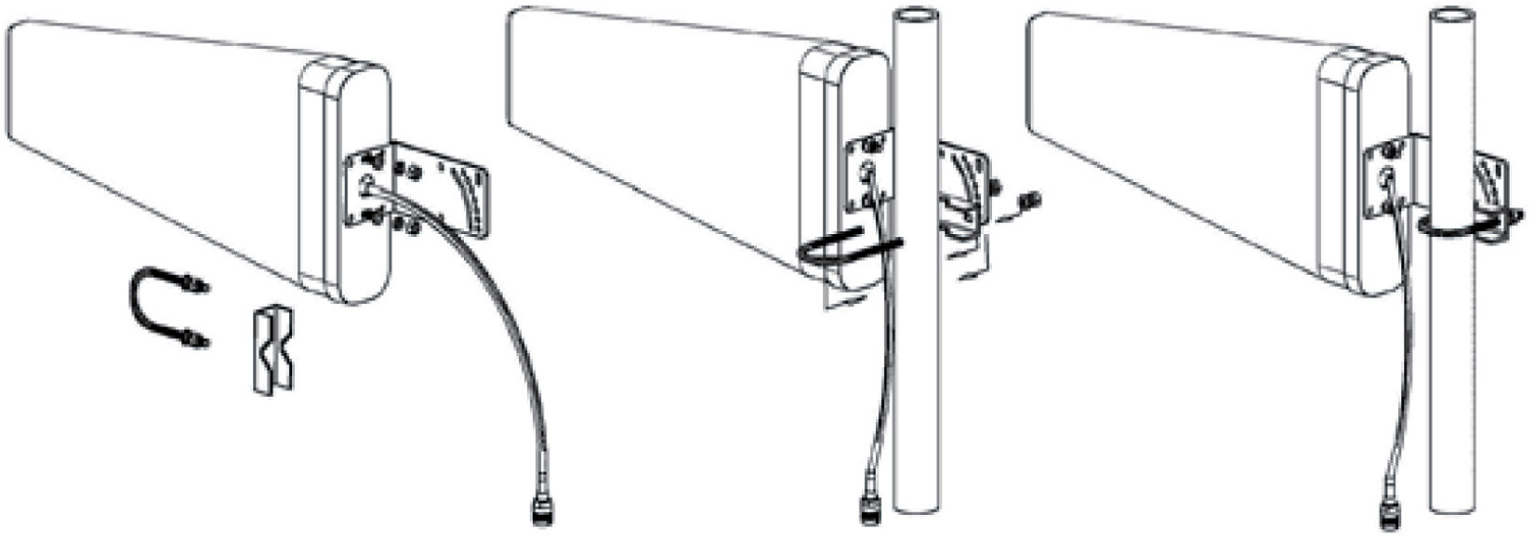
The TQ-230W is an outdoor yagi antenna that can be aimed in the direction of the closest cellular tower and pick up signals up to 30 miles away. The wide band yagi antenna is designed to cover 2G/3G/4G/and WLAN systems for Cellular, PCS, AWS and LTE frequencies.

When installing, any metallic rods must be at least 3 feet from the antenna. Mount the entire assembly to a 1 to 2 inch diameter pole (not included). In addition to the antenna, mounting equipment is included for mounting to either a flat horizontal surface or wall. For best results, the white fiber-glass portion of the antenna should be mounted above the roof line and unobstructed in the direction of the tower.

Technical Specifications

Frequency	698-806 / 806-960 / 1710-2700 MHz
Input Impedance	50 ohm
Antenna Gain	8 dBi
VSWR	≤1.8
Polarization Type	Vertical
Radiation	Directional
Maximum Power	50 Watt
Connector Type	N-Female
Diameter	Φ40~50
Dimension	17.3" x 8" x 1.45"
Color	White
Weight	2 lb 4 oz
Beamwidth	E50 H75 / E50 H75 / E40 H60

TOWER IQ™
SIGNAL WHERE IT MATTERS



Installation

1. Install U-Bolt on pole
2. Slide pipe clamp over U-Bolt with the flat side facing away from the pipe.
3. Slide antenna bracket onto U-Bolt in desired location.
4. Install flat washer, split washer and nut, hand tighten

Note: Antenna may be installed on a variety of pipe angles. Ensure that the antenna is pointing in the direction of the closest cellular tower, and is vertical with the drip hole at the bottom.

Ordering Information

Model	Description	Stock No.
TQ-230W	TQ-230W Wide Band Yagi Dir 50 ohm, 10 to 11dBi (inc mounting kit)	3996048